

## **How to deal in the future with accident cause number one: Inattention**

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Today driver's inattention and distraction is accident cause number one. The number of gadgets distracting drivers' attention is growing (voice based in-car-interaction systems, data-glasses, driver assistant systems, mobile phone ...). Further increase of this cause of accidents has to be expected.

First, current research is highlighted. Then recommendations concerning how to cope with this growing risk are presented.

### **Current research**

The latest research was published in March 2015 (Carney et al.). Researchers at the University of Iowa examined data from teen driver crashes captured on the Ltxx DriveCam in-vehicle video camera system. 1,691 crashes have been analysed. Drivers were ages 16-19. Crashes occurred between August 2007 and July 2013. The driver was inattentive or engaged in some other non-driving-related activity in 58% of crashes. This study was funded by the American Automobile Association Foundation for Traffic Safety. (AAAFoundation.org)

The main distractors in young drivers involved in accidents are:

1. Interaction with passengers: 15 %
2. Using a cell-phone: 12 %
3. Looking at something in the vehicle: 10%
4. Looking at something outside the vehicle: 9%
5. Singing/dancing to music: 8%
6. Grooming: 6%
7. Reaching for an object. 6 %
8. Etc.

Crash videos can be watched on internet:

[https://www.youtube.com/watch?v=SDWmwxQ\\_NnY&feature=youtu.be](https://www.youtube.com/watch?v=SDWmwxQ_NnY&feature=youtu.be)

Since 2012 causes of accidents are analysed by the police for every accident with personal injury in Austria. "Inattention / distraction" is found to be cause of accident number one: In the year 2012: 34.7%, in 2013: 37.1% and in 2014 already: 38.3%. These figures indicate that inattention and distraction behind the wheel is an increasing problem (Statistik Austria).

Maycock (1995, 2002) from TRL (Transport Research Laboratory, England) was the first researcher who published about inattention as a major cause of accidents. For all drivers it has been found that inattention appears to be the main accident factor at all. He carried out a questionnaire study with male drivers and found that the majority of accidents were caused by inattention (24%).

A kind of follow up study by Bartl & Hager (2006) in co-operation with the Austrian federal institute for traffic analysed in 2,128 face to face in-depth interviews 852 guilty accidents of both genders.

Inattention / distraction was found to be the main cause of accidents in 35,6% of the cases. The details of these 35,6% are: 17,1%, were 'lost in thought', followed by 'intensive discussions' in the car with 4,6%, distraction due to mobile phones with 4,3%, busy doing something (radio, smoking, eating...) with 3,9%, distracted by something interesting in the street with 2,8%, distraction due to a child-passenger at 1,4% and 'other' distractions at 1,6%.

Talbot, R. & Fagerlind, H., (2009) found that 32% of crashes recorded in the SafetyNet Accident Causation database involved at least one driver, rider or pedestrian, who had been inattentive or distracted. The SafetyNet Accident Causation Database contains 1005 accidents. The crash data stored in the database were collected by six crash investigation teams operating in Germany, Italy, The Netherlands, Finland, Sweden and the UK.

In a recent German Meta-Analysis (Kühn & Gehlert, 2015) based on 56 studies carried out by the German Association of Insurances (GDV) and the Technical University Braunschweig the quantity of distraction from various distractors has been ranked:

1. SMS writing / reading: 69%
2. Cellphone handling: 62%
3. Navigation use: 59%
4. cellphone call: 47%
5. MP3-player searching for title: 47%
6. Sending SMS: 44%
7. On-board-computer use: 34%
8. Passengers: 33%
9. Searching for radio station: 17%
10. Receiving SMS: 15%

In Austria novice drivers have to participate in a traffic-psychological seminar. Learning about attention is a key element of these seminars. Traffic-psychologists collected the following data from 2,130 novice drivers (Bartl, 2015): 6.1% already caused an accident due to inattention / distraction within the first 9 month in average after issuing of the licence (this is about one third of all guilty accidents – see below). Further 19.4% of this sample reported near-accidents due to inattention / distraction.

18.9% of novice drivers in this sample caused already guilty accidents for any reason. As mentioned above 6.1% of this sample caused an accident due to inattention / distraction. Consequently, about one third (32.3%) of all guilty accidents has been caused by inattention / distraction (32.3% equals 6.1% out of 18.9%).

In a next step the novice drivers of this sample have been asked what their main distraction is based on their own experience. Their answers: 19% stated that they are primarily distracted by cell phone calls, 16.2% by sms writing, 15.7% by being lost in thoughts, 15.4% by passengers, 10.8% by music, 10% by looking at something irrelevant, 4.3% by navigation, 2.6% by eating/drinking and 6.2% by other distractors. Further 5% reported to have already fallen asleep behind the wheel.

Research from the University of Utah (Strayer et al., 2014) funded by the AAA Foundation for traffic Safety indicates that even in-vehicle voice based interactive technologies cause significant distraction while driving. The authors conclude: Because each voice based interactive task tested allowed the driver to keep his hands on the steering wheel and his eyes on the road, any impairment to driving must be caused by the diversion of attention from the task of driving.

Also actual research from Germany (Paridon et al., 2015) indicates that voice based sms-writing (hands-free) results in significant impairment in a lane-tracking task compared to lane-tracking without distraction. The strongest impairment was observed when candidates were writing (not hands-free) sms on the cell-phone.

Researchers from the University College London (Lavie et al., 2014; Rees et al., 1997) analyzed in the fMRI (functional Magnetic Resonance Imaging) that the visual cortex (the brain part that is used for vision) shuts down under high perceptual cognitive load (detecting disyllabic words). This finding can be seen as a neural correlate for the phenomenon of “inattention blindness”.

## **Recommendations**

Understanding of “inattention blindness” and “change blindness” are the key-elements in coping with the cause of accident number one: Inattention and distraction. Legislation can only reduce these forthcoming risks as long as such kind of legislation can be enforced by the police which is difficult. Consequently, in the first place suitable attitudes and motivations of drivers must be achieved in order to induce willingness to manage the driving task without distraction.

Paaver et al. (2013) evaluated the effectiveness of a specific psychological intervention. In Estonia psychologists carried out a short time intervention in form of an “impulse control workshop” during the driving school training. The participants were involved in significantly less accidents compared to a control group. The psychologists did not work on attitudes in general or knowledge on statistics etc. but specifically and personally on own tendencies of impulsiveness of their seminar participants. The participants have learned nothing else but about themselves. This result indicates that working on specific psychological phenomena (in this case impulsiveness) is effective. In the same way it can be expected that working on the psychological phenomena of attention can have a significant impact on traffic safety.

As inattention has become the main cause of accidents, new ways of coping with this kind of risk are necessary. In specific psychological seminars these resources can be activated by motivational exercises.

A systematic understanding of what is influencing human behavior can be the basis for drivers’ basic and further education. The so called “executive brain functions” (self-regulation, stimulus-suppression, impulse-control, focusing and sustaining attention, planning and considering consequences of own behaviour, ...) as well as the adequate co-ordination of the procedural memory (responsible for automatized behaviour) and the declarative memory (responsible for consciously behaviour) can be seen as the human key-resource to support safe driving in a more and more

distracting environment. So far, these human resources have not been in the focus of driver education.

Distracting tasks can be included in the driving test (absolutely in a 100% standardised scheme). As a result it would be trained in driving schools which will raise awareness of this growing risk (driving teacher must be trained for this task in a standardised form). Standardised tasks of examiners and driving teachers must be harmonised. In psychological distraction-exercises novice drivers can experience the limitation of their brain. Consequently, they will achieve better self-evaluation-skills (right column of the GDE-Matrix).

Finally, a standardised scheme to analyse causes of accidents can be elaborated by researchers in order to support national governments in their accident recording. Subsequently, data can be compared within Europe.

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**CV:**

Dr Gregor Bartl, born in 1962 in Vienna / Austria; Director of the *institute alles-fuehrerschein.at* in Austria, a traffic psychological institute for seminars, testing and research. Gregor Bartl studied psychology at the University of Vienna. He is specialised in traffic-psychology since 1990. He was the manager of the EU-projects DAN – on novice drivers measures, ANDREA on driver rehabilitation programmes, MERIT on standards for driving instructors and HERMES on coaching in driver training. Further he conducted research on accident causation, alcohol impairment, track training courses, young drivers, psychophysiology of speeding, etc. In 2003 he was one of the initiators of the second phase licensing system in Austria. Since 2005 he is one of two directors of the driving instructors education at the Chamber of Commerce in Vienna. From 2006 to 2008 he was member of the Austrian Transport Safety Advisory Board of the Ministry of Transport. From 2009 to 2010 he was member of the Expert Group on Driver Training of the European Commission. He is member of the German Society for Traffic-Psychology (DGVP) and of Traffic Psychology International (TPI). He develops and applies with his team of about 40 traffic-psychologists seminar-programmes for novice drivers, driving instructors, professional drivers and traffic-offenders.